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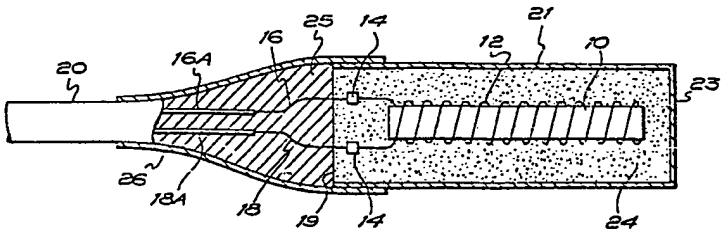
(54) Temperature probe

(57) A temperature sensitive probe, for location for example in a flow of air, comprises an elongated outer case containing a temperature sensitive resistance coil on a ceramic core. A heat conductive compound forms a bedding material for the coil and core. The end of the case is sealed by an epoxy resin and a sealing sleeve is heat shrunk onto the end of the case on the lead wires leading to the coil terminals.



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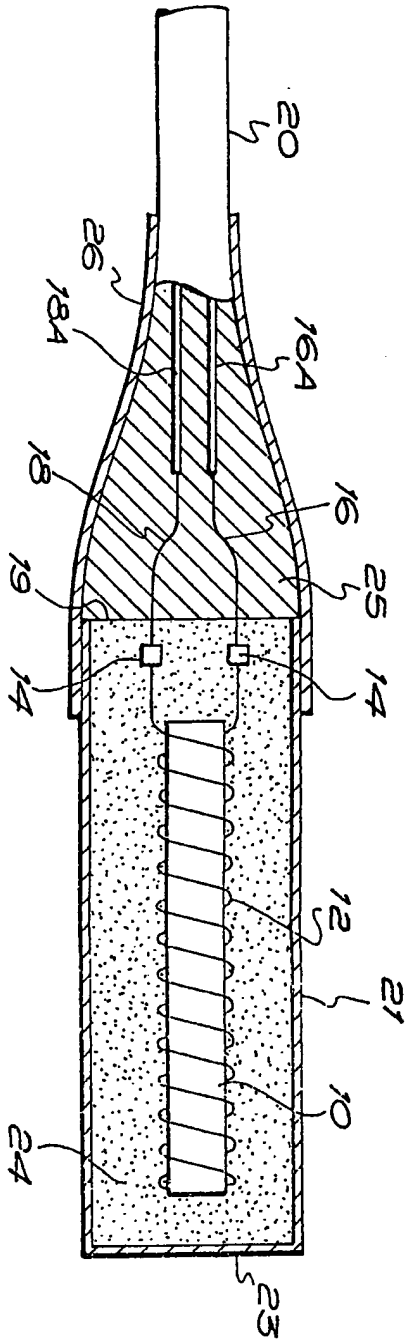

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Temperature probe

This invention relates to a temperature probe for sensing the temperature of a location of a fluid environment which may be static or in motion. By fluid environment it is meant any fluid substance such as gas or vapour, or liquid or indeed fluent solid material which is of a nature into which the probe can be placed so as to be contacted intimately therewith.

Specifically, the probe may be used for temperature sensing of the flow of air in a system as disclosed in co-pending Application No. 8429904 requiring monitoring of the temperature of the flow of air, and adjustment of the source giving rise to the flow of air and the temperature thereof, and more specifically, the probe may be used in connection with refrigerated display cabinets for the display of produce which requires to be kept at a low temperature to preserve its freshness, and in which cabinets there is a flow of air around and through the cabinet, such air flow being passed through a heat exchanger removing heat therefrom as the chilled air in circulating through the cabinet picks up heat from the produce and electrical components or by inducing warmer ambient air in the location of the cabinet.

The probe according to the present invention is designed to give accurate and fast response, and furthermore is designed to withstand corrosive environments such as exist in refrigerated display cabinets.

The probe according to the invention comprises a temperature sensing probe comprising an electrical sensing coil whose resistance varies with temperature variation, and the coil is embedded in a heat conductive compound, the compound and coil being contained in an outer case of metal which is closed at one end, and at the other end, the wires coupling the coil to an electrical circuit, or for coupling the wires to an electrical circuit, emerge, and said end is sealed against corrosive environments by having applied thereto a sealing sleeve which is of heat shrinkable material, and such sleeve having been heat shrunk to the outer case and conducting wires.

The probe according to the invention has a number of specific features which in themselves constitute advancement in the art, and each is to be considered as independently inventive.

Thus, the utilisation of a coil as the sensing element constitutes an advance in the art. We prefer to use a platinum resistance coil on a ceramic core. Specifically, the coil comprises a class 1 wire wound platinum resistance thermometer. Also constituting a step forward in this art comprises the utilisation of a heat shrinkable sleeve for forming the seal at the end of the outer case from which the wires emerge. The sleeve may be a heat shrinkable rubberized composition. The probe according to the invention functions simply in that the probe is placed in the environment whose temperature is to be sensed, for example a flow of air in a system as described above, and in a specific example, a sensing coil which is resistance responsive to temperature changes is used. In a specific example, the coil experiences a resistance change of .39 ohms for every degree centigrade of variation in temperature. It is therefore of importance that the outer case and the compound in which the coil is embedded be heat conductive to an extent giving the coil as fast a response time as possible.

An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawing which is a sectional side view of a temperature probe according to the invention.

The probe comprises essentially an elongated structure, and there is a central core 10 around which the temperature sensitive coil 12 as described herein is wound as shown. The ends of the coil 12 are soldered as indicated at 14 to the ends of respective conductive wires 16, 18 which have electrically insulating coverings 16A, 18A, and the wires 16, 18 are contained in a single outer insulating cover 20. The wires 16, 18 emerge from the open end 19 of a stainless steel "can" 21 in which the coil is contained, the other end 23 of the can being closed. Within the can is a compound 24 of zinc oxide silicone compound, which completely fills the space between the coil and the inside of the can, and the end 19 is sealed with epoxy or other resin 25 as shown.

Finally, the open end of the can is sealed by means of a heat shrinkable sleeve 26 of the type described herein, which is shrunk into the position shown effectively gripping and sealing the outside of the can on the one hand, and the cable cover 20 on the other hand.

The probe described exhibits a fast response, the coil exhibiting a resistance change of .39 ohms for each temperature degree rise and fall of the air flow in which the probe is located.

CLAIMS

1. A temperature sensing probe comprising an electrical sensing coil whose resistance varies with temperature variation, and the coil is embedded in a heat conductive compound, the compound and coil being contained in an outer case of metal which is closed at one end, and at the other end, the wires coupling the coil to an electrical circuit, or for coupling the wires to an electrical circuit, emerge, and said end is sealed against corrosive environments by having applied thereto a sealing sleeve which is of heat shrinkable material, and such sleeve having been heat shrunk to the outer case and conducting wires.

2. A probe according to claim 1, wherein the sensing coil comprises a platinum resistance coil wound on a ceramic core.

3. A probe according to claim 1 or 2, wherein the heat conductive compound is a zinc oxide silicone compound.

4. A probe according to any preceding claim wherein said outer case is of stainless steel.

5. A probe according to any preceding claim, wherein an epoxy resin inside the sleeve seals the end of the outer case.

6. A temperature sensing probe substantially as hereinbefore described with reference to the accompanying drawing.

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